

COMPLIANCE SUMMARY

Introduction

During 2001, Lawrence Livermore National Laboratory participated in numerous activities to comply with federal, state, and local environmental regulations as well as internal requirements and applicable Department of Energy (DOE) orders. This chapter, which is organized according to the various laws and regulations that drive LLNL's compliance activities, describes those activities the Laboratory carried out related to air, water, waste, waste reduction, community "right to know," protection of sensitive resources, and other environmental issues at the Livermore site and Site 300. A wide range of compliance activities is summarized in this chapter. Compliance activities specific to the applicable DOE orders are discussed in the chapters that follow. Applicable DOE orders are those identified in LLNL's Work Smart Standards (WSS), a set of environmental, safety, and health standards specific to operations at the Laboratory (see Chapter 3). Other environmental program information, including the Environment, Safety, and Health Management System and pollution prevention and waste minimization activities, is also discussed in Chapter 3. Many documents concerned with these activities and other environmental topics are

available for public viewing at the LLNL Visitors Center, the Livermore and Tracy public libraries, or on the Internet at

<http://www-envirinfo.llnl.gov>.

Comprehensive Environmental Response, Compensation and Liability Act

The Livermore Site Groundwater Project (GWP) and the Site 300 CERCLA Project are under the jurisdiction of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act, Title 1. As part of work on these





projects, DOE and LLNL also continued with environmental restoration and community relations activities. These projects and activities are described in the following sections.

Livermore Site Groundwater Project

The GWP at the Livermore site complies with provisions specified in a federal facility agreement (FFA) entered into by the U.S. Environmental Protection Agency (EPA), DOE, the California EPA's Department of Toxic Substances Control (DTSC), and the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). As required by the FFA, the project addresses compliance issues by investigating potential contamination source areas (such as suspected old release sites, solvent-handling areas, and leaking underground tank systems), by continuous monitoring, and by remediation of groundwater.

The groundwater contaminants (constituents of concern) are volatile organic compounds (VOCs), primarily trichloroethene (TCE) and tetrachloroethene (PCE). For the most part, these contaminants are present within the site boundary, but are present to some extent beyond the boundary, mainly to the west and south of the site (see **Figures 8-3 to 8-8**). In 2001, GWP activities included preparing the required CERCLA documents, meeting milestones, operating groundwater treatment facilities, and maintaining liaison with community groups.

In 2001, DOE and LLNL submitted documents required by the CERCLA and the Livermore Site FFA. In addition, DOE and LLNL continued environmental restoration and community activities as discussed below.

Documentation

As required by the FFA, DOE and LLNL issued the *Ground Water Project 2000 Annual Report* (Aarons et al. 2001) on schedule on March 31, 2001. DOE and LLNL also issued six final Remedial Project Managers' (RPMs') meeting summaries. Quarterly self-monitoring data were reported in letter reports (Bainer and Abbott 2001; Bainer and Joma 2001a, 2001b, 2002a).

Milestones and Activities

Three milestones were completed ahead of schedule and one was delayed three months with regulatory concurrence because new work was not authorized by the Federal budget at the beginning of fiscal year 2001. The commencement of operation of the Treatment Facility E Southeast miniature treatment unit (MTU) was delayed until March 19, 2001. The three completed milestones were achieved by beginning operation of the Treatment Facility E West MTU on April 26, 2001, beginning operation of the Treatment Facility D Marina Pipeline on July 25, 2001, and beginning Phase 3 of the Treatment Facility 5475 catalytic reductive dehalogenation unit on September 19, 2001.

Other activities related to the Livermore CERCLA project included continued implementation of Engineered Plume Collapse (an integration of hydrostratigraphic unit analysis, smart pump and treat, source isolation, and treatment of VOCs in fine-grained sediments), initial testing of electroosmosis in the Treatment Facility D Helipad area, and finalizing a revised Consensus Statement.

LLNL installed and performed a hydraulic test on a new off-site well, and installed a new well to monitor for leaks around the on-site gasoline station. LLNL also provided groundwater level elevations to the Alameda Flood Control and Water Conservation District Zone 7 for use in analyzing water levels in the Mocho 1 Subbasin.

Treatment Facilities

DOE and LLNL operated all facilities in treatment facilities TFA, TFB, TFC, TFD, TFE, TFG, TF406, TF518, and TF5475 areas in 2001. A total of 77 groundwater extraction wells operated at 25 separate locations at an average flow rate of 2,893,000 L/day. Vapor treatment facilities VTF518 and VTF5475 operated at an average flow of 670 m³/day from 2 soil vapor extraction wells. Together, the groundwater and vapor treatment facilities removed approximately 215 kg of VOC mass in 2001 compared to 269 kg in 2000. Since remediation began in 1989, approximately 6.6 billion L of groundwater and over 934,400 m³ of vapor have been treated, removing more than 1238 kg of VOCs. (See Chapter 8 for further information.)

Community Relations

The Community Work Group (CWG) met once in 2001 to discuss the DOE budget, technology deployments, the Consensus Statement, and progress of the Livermore site cleanup. Correspondence and communication continued with CWG members throughout the year. DOE and LLNL met twice with members of Tri-Valley Communities Against a Radioactive Environment (CAREs) and their scientific advisor as part of the activities funded by an Environmental Protection Agency Technical Assistance Grant.

Other Livermore site community relations activities in 2001 included communications and meetings with neighbors, local, regional, and national interest groups, and other community organizations; making public presentations; producing and distributing the Environmental Community Letter; maintaining the Information Repositories and the Administrative Record; conducting tours of the site environmental activities; and responding to public and news media inquiries. In addition, community questions were addressed via e-mail, and project

documents, letters, and public notices were posted on a public website at www-envirinfo.llnl.gov.

Site 300 CERCLA Project

Investigations and remedial activities are ongoing at Site 300, which became a CERCLA/Superfund site in 1991, when it was placed on the National Priorities List. Investigations and remedial activities are conducted under the joint oversight of the EPA, the Central Valley Regional Water Quality Control Board (CVRWQCB), California EPA's DTSC, and the authority of an FFA for the site. (There are separate FFAs for Site 300 and the Livermore site.)

During 2001, LLNL performed all actions stipulated in the FFA and maintained liaison with community groups. Results and status for Site 300 environmental restoration operable units are discussed in Chapter 8. Background information for LLNL environmental characterization and restoration activities at Site 300 can be found in the *Final Site-Wide Remedial Investigation Report, Lawrence Livermore National Laboratory Site 300* (Webster-Scholten 1994).

Documentation

LLNL submitted all required documentation to oversight agencies on time in 2001. The *Draft Final Interim Site-Wide Record of Decision for Lawrence Livermore National Laboratory Site 300* (U.S. DOE 2001), *Five-Year Review Report for the General Services Area Operable Unit* at Lawrence Livermore National Laboratory Site 300 (Ferry et al. 2001a), *Remedial Design Work Plan for Interim Remedies at Lawrence Livermore National Laboratory Site 300* (Ferry et al. 2001b), *Draft Five-Year Review Report for the Building 834 Operable Unit* (Gregory et al. 2001), *Draft Final Interim Remedial Design for the Building 834*



Operable Unit Treatment Facility (Ferry et al. 2001c), quarterly reports, and other work plans were among the documents submitted.

Milestones and Activities

LLNL has completed all the 2001 FFA milestones for Site 300 on or ahead of schedule. For a detailed list of these milestones and corresponding dates, see **Table 8-2**.

Treatment Facilities

VOCs (primarily TCE) are the main contaminants at Site 300. High explosives, tritium, depleted uranium, organosilicate oil, nitrate, and perchlorate are also found in groundwater. Twelve treatment facilities that remove and treat VOCs operated throughout 2001. These facilities are discussed in more detail in Chapter 8. Fifteen wells that extract groundwater only and 25 wells that extract both groundwater and soil vapor operated during 2001, treating about 94.2 million L of groundwater. The 25 wells that extract both vapor and groundwater together removed 922,000 m³ of vapor. In 2001, the Site 300 treatment facilities removed approximately 36.1 kg of VOCs. Since remediation efforts began in 1990, more than 772 million L of groundwater and approximately 3.13 million m³ of vapor have been treated, to yield about 198.2 kg of removed VOCs. See Chapter 8 for maps of the operable units and details of the distribution of all contaminants in groundwater at Site 300.

Community Relations

The Site 300 CERCLA project maintains proactive communication with the surrounding communities of Tracy and Livermore. Community relations activities in 2001 included maintenance of the information repositories and administrative records; off-site, private well-sampling activities; mailings to stakeholders; and interviews with the news media. Meetings were held with Tri-Valley

CAREs, which receives an annual technical assistance grant from EPA to independently evaluate CERCLA activities at Site 300.

On April 17, 2001, and August 15, 2001, at the request of the public, LLNL conducted two tours of Site 300 investigation areas and treatment facilities.

On May 15, 2001, the remedial project managers held a public workshop to present and explain to the community the overall plan and schedule for implementing environmental remedies as outlined in the *Site-Wide Remedial Design Work Plan* (Ferry et al. 2001c).

Site Evaluations Prior to Construction

Before any construction begins, the CERCLA Record of Decision (ROD) for the Livermore site requires that the project site be evaluated to determine if soil or rubble (concrete and asphalt) is contaminated. Soil is sampled and analyzed for potential radioactive and/or hazardous contamination. Depending on the analytical results, soil may be reused on site or disposed of according to established procedures. Depending on the potential for radioactive contamination, rubble may be either surveyed or analyzed for radioactivity. During 2001, soil and rubble were evaluated at 66 construction sites.

Agency for Toxic Substances and Disease Registry Assessment

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency whose mission is to prevent adverse human health effects and diminished quality of life associated with exposure to hazardous substances from waste sites, unplanned releases, and other sources of pollution in the environment. ATSDR is mandated by Congress to conduct public health

assessments (PHAs) of communities, such as Livermore, that are adjacent to DOE sites undergoing CERCLA cleanup. During the PHA process, at a meeting in April 2000, members of the Livermore community expressed specific concerns related to the environmental monitoring and dose evaluation of tritium, as well as the health impact of past releases. To address these concerns, in 2000 ATSDR convened a panel of five independent experts in the fields of tritium analysis and dosimetry to complete a health consultation on tritium related to LLNL-operations.

Three draft reports were prepared by the expert panel and ATSDR in February, May, and July 2001 and distributed for comment. A Public Health Assessment Site Team Meeting was held November 8, 2001, in Livermore to present the conclusions of the PHA to the public. ATSDR concluded that total tritium doses to the communities surrounding LLNL, including potential contributions from organically bound tritium, tritiated water, and tritiated hydrogen gas, are below levels of public health concern and are adequately assessed by current monitoring and modeling. The report of the expert panel (*Environmental Tritium Evaluations at SRS and LLNL with Emphasis on the Monitoring and Dosimetry of Organically-Bound Tritium*) and the conclusions of ATSDR can be found at http://www.atsdr.cdc.gov:80/HAC/PHA/livermore2/liv_toc.html.

ATSDR also is preparing an exposure assessment of the 1965 and 1970 accidental tritium gas releases from LLNL. Preliminary analysis of reported data plus dispersion and dose modeling suggest that the one-time exposures to the public following these releases cannot be considered public health hazards, nor will any adverse health effects be found.

Public comment on the July draft was extended from October to December. A final report is expected in mid-2002.

Superfund Amendment and Reauthorization Act, Title III

Title III of the Superfund Amendment and Reauthorization Act (SARA) is known as the Emergency Planning and Community Right-to-Know Act (EPCRA). It requires owners or operators of facilities that handle certain hazardous chemicals on site to provide information on the release, storage, and use of those chemicals to organizations responsible for emergency response planning. Executive Order 13148 directs all federal agencies to comply with the requirements of EPCRA, including SARA 313, Toxic Release Inventory Program.

EPCRA requirements and LLNL compliance are summarized in [Table 2-1](#). [Table 2-2](#) and [Table 2-3](#) identify those chemicals and their related hazards reported during 2001 by LLNL for the Livermore site and Site 300, respectively, under Title III, Section 311.

Clean Air Act—Air Quality Management Activities

All activities at LLNL are evaluated to determine the need for air permits and are operated in full compliance with all applicable requirements. Air permits are obtained from the Bay Area Air Quality Management District (BAAQMD) for the Livermore site and from the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) for Site 300. In 2001, LLNL operated 110 air emission sources for the Livermore site. BAAQMD inspectors found no deficiencies at the Livermore site (see [Table 2-4](#)). There was no

**Table 2-1. Summary of LLNL compliance with EPCRA in 2001**

EPCRA requirement ^(a)	Brief description ^(a)	Compliance
302 Planning Notification	Operator must notify SERC of presence of extremely hazardous substances. In California, operator must notify CEPRC of presence of extremely hazardous substances above threshold planning quantities.	Originally submitted May 1987.
303 Planning Notification	Operator must designate a facility representative to serve as emergency response coordinator.	Update submitted April 9, 2001.
304 Release Notification	Releases of certain hazardous substances must be reported to SERC and LEPC.	No EPCRA-listed extremely hazardous substances were released above reportable quantities.
311 MSDS/Chemical Inventory	Operator must submit MSDSs or chemical list to SERC, LEPC, and Fire Department.	Tables 2-2 and 2-3. Updated April 9, 2001.
312 MSDS/Chemical Inventory	Operator must submit hazardous chemical inventory to local administering agency (county).	Business plans and chemical inventory submitted to San Joaquin County (January 12, 2001) and Alameda County (February 28, 2001).
313 Toxic Release Inventory	Operator must submit Form R to U.S. EPA and California EPA for toxic chemicals released.	A negative declaration statement dated July 13, 2001, was submitted to DOE; no thresholds were exceeded for TRI reporting year 2000.

^a See Acronyms and Abbreviations for list of acronyms

action taken by the BAAQMD to process or finalize LLNL's Synthetic Minor Operating Permit in 2001. The Synthetic Minor Operating Permit was applied for in 2000 and is to provide BAAQMD with an accounting of data about the potential to emit regulated pollutants from LLNL operations, a list of the permitted and exempt sources on site, a proposed limit on any regulated pollutant that exceeds the limits set in the regulations, and an explanation of how LLNL will comply with the conditions set forth in the permit. In 2001, SJVUAPCD issued or renewed air permits for 45 air emission sources for Site 300 (see [Table 2-5](#)). At Site 300, SJVUAPCD conducted startup inspections of two sources in accordance with their Authority to Construct permits: the Contained Firing Facility (CFF) and the Central

General Service Area (CGSA) air stripper. SJVUAPCD inspectors found no deficiencies at Site 300 (see [Table 2-4](#)).

National Emission Standards for Hazardous Air Pollutants, Radionuclides

To demonstrate compliance with the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for radiological emissions (40 Code of Federal Regulations [CFR] 61, Subpart H), LLNL is required to monitor certain air release points and evaluate all potential sources of radionuclide air emissions to determine the possible effective dose equivalent to the maximally exposed individual of the public. These evaluations include modeling (using EPA-sanctioned computer codes) based on

Table 2-2. Livermore site, SARA, Title III, Section 311, Chemical List, 2001

Livermore site chemicals	Physical hazard ^(a)			Health hazard ^(a)	
	Fire	Pressure	Reactivity	Acute	Chronic
Air		•			
Ammonium hydroxide				•	
Argon		•		•	
Carbon, activated	•				
Carbon dioxide		•		•	
Chlorine		•	•	•	
Chromium(III) chloride				•	•
Cobalt	•			•	•
Diesel fuel	•			•	•
Ethyl alcohol	•			•	•
Freon 113				•	
Gasoline	•			•	•
Glass cleaner		•		•	
Helium		•		•	
Hydrofluoric acid		•(b)	•	•	•
Hydrogen peroxide (<52%)			•		
Insulating oil, inhibiting	•			•	
Joint compound				•	
Krypton		•		•	
Lead (bricks, ingots)				•	•
Lithium hydride	•		•	•	
Mineral oil	•			•	
Neodymium oxide				•	
Nitric acid	•		•	•	•
Nitric oxide		•	•	•	
Nitrogen		•		•	
Oil, Diala AX	•			•	
Oil, DTE-26	•				
Oil, vacuum pump	•			•	
Oil, waste	•				
Oxygen	•	•			

**Table 2-2. Livermore site, SARA, Title III, Section 311, Chemical List, 2001 (continued)**

Livermore site chemicals	Physical hazard ^(a)			Health hazard ^(a)	
	Fire	Pressure	Reactivity	Acute	Chronic
Paint	•	•		•	•
Potassium cyanide				•	
Potassium hydroxide			•	•	•
Potassium phosphate, monobasic				•	
Propane	•	•		•	
Refrigerant 123 SUVA				•	•
Sodium cyanide			•	•	
Sodium hydroxide			•	•	
Sodium hypochlorite				•	
Sulfuric acid			•	•	•
Tantalum				•	
Thinner, lacquer	•			•	•

a Physical and health hazard information obtained primarily from material safety data sheets

b Some containers have a pressure hazard because hydrofluoric acid has the potential to form hydrogen fluoride gas.

radionuclide inventory data, air effluent (source emission) monitoring, or air surveillance monitoring.

The *LLNL NESHAPs 2001 Annual Report* (Harrach et al. 2002), submitted to DOE and EPA, reported that the estimated total sitewide maximally exposed individual radiological doses for the Livermore site and Site 300 were 0.17 μ Sv (0.017 mrem) and 0.54 μ Sv (0.054 mrem), respectively, for 2001.

The reported doses include contributions from both point and diffuse sources. The totals were well below the 100 μ Sv/y (10 mrem/y) dose limits defined by the NESHAPs regulations. The details of these data are included in this report (see Chapter 13).

In 2001, LLNL continuously monitored radionuclide emissions from Building 331 (the Tritium Facility), Building 332 (the Plutonium Building), and portions of five other facilities (see Chapter 4). There were no unplanned atmospheric releases at the Livermore site or at Site 300 in 2001.

Clean Water Act and Related State Programs

Preserving clean water is one objective of local, state, and federal regulations. The National Pollutant Discharge Elimination System (NPDES) under the Federal Clean Water Act (CWA) establishes permit requirements for discharges into waters of the United States. In addition, the State of California, under the Porter Cologne Water Quality Control Act, requires permits, known as

Table 2-3. Site 300, SARA, Title III, Section 311, Chemical List, 2001

Site 300 chemicals	Physical hazard ^(a)			Health hazard ^(a)	
	Fire	Pressure	Reactivity	Acute	Chronic
Carbon, activated	•				
Chlorine		•	•	•	
Bis(2,2-dinitro-2-fluoroethyl)formal in methylene chloride	— ^(b)		— ^(b)	•	•
Diesel fuel	•			•	•
Gasoline	•			•	•
High explosives			•		
Lead (bricks, ingots)				•	•
Nitrogen		•		•	
Oil, hydraulic	•			•	
Oil, inhibited insulating	•				
Oil, Diala Ax	•			•	
Oil, transformer	•				
Roof acrylic coating				•	•
Steam cleaning solution/split equipment cleaner		•		•	•
Sulfuric acid			•	•	•

a Physical and health hazard information obtained primarily from material safety data sheets

b Dangerous fire or explosion risk in neat form (solvent evaporates)

Waste Discharge Requirements (WDRs), for any waste discharges affecting the beneficial uses of waters of the state. The regional water quality control boards are responsible for issuing and enforcing both permits as well as water quality certifications for discharges controlled by Section 401 of the CWA.

Several agencies issue other water-related permits. The Livermore Water Reclamation Plant (LWRP) requires permits for discharges of sewerable water to the city sanitary sewer system. The Army Corps of Engineers (ACOE) issues permits for work in navigable waterways below the ordinary high-water mark and for controlling fill operations in waters of the United States. The State Water Resources Control Board (SWRCB) can issue statewide NPDES permits/WDRs or water quality

**Table 2-4. Inspections and tours of the Livermore site and Site 300 by external agencies in 2001**

Medium	Description	Agency ^(a)	Date	Finding ^(a)
Livermore Site				
Air	Emission sources	BAAQMD	11/8 12/6	No violations
Sanitary sewer	Annual compliance sampling	LWRP	10/2, 10/8–9	No violations
	Categorical sampling		10/15 10/31	No violations
Waste	Hazardous waste facilities	DTSC	6/20–6/22	Received an Inspection Report and final SOV on 11/6/01 with two minor violations and one violation categorized as “other violation.” All violations were resolved by LLNL before the final SOV was received on 11/6/01.
	Medical waste	ACDEH	9/25	No violations
Water	Arroyo Las Positas	SFBRWQCB	4/23 8/29	No violations
Storage tanks	Compliance with underground storage tank upgrade requirements and operating permits.	ACHCS	6/26, 8/21, 9/4 9/17, 10/17	No violations
HW Transportation	Biennial terminal inspection	CHP	1/5	Three minor deficiencies (short mud flaps, two loose bolts) corrected during inspection
Site 300				
Air	Emission sources Startup inspection of Contained Firing Facility and CGSA air stripper.	SJVUAPCD	3/6	No violations
Water	Permitted operations	CVRWQCB	10/16	No violations
Waste	Permitted Hazardous Waste facilities (EWTF, EWSF, B883 CSA), Waste Accumulation Area B883 North, and Generator Areas.	DTSC	5/16–5/18	Three violations were issued. One violation was issued on 5/18 and two additional violations were issued in an amended inspection report which LLNL received on 8/15. All violations have been corrected.
			8/16–8/17	No violations

a See Acronyms and Abbreviations for list of acronyms

Table 2-5. Summary of permits active in 2001^(a,b)

Type of permit	Livermore site	Site 300
Air	BAAQMD issued 110 permits for operation of various types of equipment, including boilers, emergency generators, cold cleaners, ultrasonic cleaners, degreasers, printing press operations, manual wipe-cleaning operations, metal machining and finishing operations, silk-screening operations, silk-screen washers, paint spray booths, adhesives operations, image tube fabrication, optic coating operations, storage tanks containing VOCs in excess of 1.0%, plating tanks, drum crusher, semiconductor operations, diesel air-compressor engines, groundwater air strippers/dryers, ovens, material-handling equipment, sewer diversion system, oil and water separator, fire test cells, gasoline-dispensing operation, paper-pulverizer system, and firing tanks.	SJVUAPCD issued 45 permits for operation of various types of equipment, including boilers, emergency generators, paint spray booth, groundwater air strippers, soil vapor extraction units, woodworking cyclone, gasoline-dispensing operation, explosive waste treatment units, and drying ovens, and the Contained Firing Facility.
Water	<p>WDR Order No. 88-075 for discharges of treated groundwater from Treatment Facility A to percolation pits and recharge basin.</p> <p>WDR Order No. 95-174, NPDES Permit No. CA0030023 for discharges of storm water associated with industrial activities and low-threat nonstorm water discharges to surface waters.</p> <p>WDR Order No. 99-08-DWQ, NPDES California General Construction Activity Permit No. CAS000002, DWTF Site ID No. 201S305140 (terminated July 2001), Soil Reuse Project ID No. 2015305529 and National Ignition Facility, Site ID No. 201S306762, for discharges of storm water associated with construction activities affecting two hectares or more.</p> <p>WDR Order No. 99-086 for the Arroyo Las Positas Maintenance Project.</p> <p>Nationwide Permit 18 for the Arroyo Las Positas Maintenance Project.</p> <p>FFA for groundwater investigation/remediation.</p>	<p>WDR Order No. 99-08-DWQ, NPDES California General Construction Activity Permit No. CAS000002, Contained Firing Facility/ Chemistry Magazine Loop, Site ID No. 5B39S307131 (terminated August 2001) for discharges of storm water associated with construction activities impacting two hectares or more.</p> <p>WDR Order No. 93-100 for post-closure monitoring requirements for two Class I landfills.</p> <p>WDR Order No. 96-248 for operation of two Class II surface impoundments, a domestic sewage lagoon, and percolation pits.</p> <p>WDR Order No. 97-03-DWQ, NPDES California General Industrial Activity General Permit No. CAS000002 for discharge of storm water associated with industrial activities</p> <p>WDR Order No. 97-242, NPDES Permit No. CA0082651 for discharges of treated groundwater from the eastern General Services Area treatment unit.</p> <p>WDR Order No. 5-00-175, NPDES Permit No. CA0082651 for large volume discharges from the drinking water system that reach surface waters.</p> <p>One ongoing project permitted under a stream-bed alteration agreement.</p> <p>FFA for groundwater investigation/remediation.</p> <p>57 registered Class V injection wells.</p>


Table 2-5. Summary of permits active in 2001^(a,b) (continued)

Type of permit	Livermore site	Site 300
Hazardous waste	<p>EPA ID No. CA2890012584.</p> <p>Authorization to mix resin in Unit CE231-1 under conditional exemption tiered permitting.</p> <p>Final Closure Plan submitted to DTSC for the Building 419 interim status unit (February 2001).</p> <p>Authorizations to construct the permitted units of Building 280, Building 695, and additions to Building 693.</p> <p>Authorization under hazardous waste permit to operate 18 waste storage units and 14 waste treatment units.</p> <p>Continued authorization to operate seven waste storage units and eight waste treatment units under interim status. Final Closure Plans submitted to DTSC for the Building 233 and Building 514 interim status units (May 2000).</p> <p>Notified DTSC on 3/31/01 that LLNL will not construct and operate Building 280 as a permitted unit as described in our Hazardous Waste Facility permit.</p>	<p>EPA ID No. CA2890090002.</p> <p>Part B Permit—Container Storage Area (Building 883) and Explosives Waste Storage Facility (issued May 23, 1996).</p> <p>Part B Permit—Explosives Waste Treatment Facility (issued October 9, 1997).</p> <p>Docket HWCA 92/93-031. Closure and Post-Closure Plans for Landfill Pit 6 and the Building 829 Open Burn Facility.</p> <p>Post-Closure Permit Application submitted for Building 829 Open Burn Facility (September 2000). Prepared a Notice of Deficiency (NOD) response document to be submitted to DTSC in February 2002.</p>
Medical waste	<p>One permit for large quantity medical waste generation and treatment covering the Biology and Biotechnology Research Program, Health Services Department, Forensic Science Center, Medical Photonics Lab, and Tissue Culture Lab.</p>	<p>Limited Quantity Hauling Exemption for small quantity medical waste generator.</p>
Sanitary sewer	<p>Discharge Permit No. 1250 (01/02) for discharges of wastewater to the sanitary sewer.</p> <p>Permit 1510G (01) for discharges of sewerable groundwater from CERCLA restoration activities.</p>	
Storage tanks	<p>Eight operating permits covering 11 underground petroleum product and hazardous waste storage tanks: 111-D1U2 Permit No. 6480; 113-D1U2 Permit No. 6482; 152-D1U2 Permit No. 6496; 271-D2U1 Permit No. 6501; 321-D1U2 Permit No. 6491; 322-R2U2 Permit No. 6504; 365-D1U2 Permit No. 6492; and 611-D1U1, 611-G1U1, 611-G2U1, and 611-O1U1 Permit No. 6505.</p>	<p>One operating permit covering five underground petroleum product tanks assigned individual permit numbers: 871-D1U2 Permit No. 008013; 875-D1U2 Permit No. 006549; 879-D1U1 Permit No. 006785; 879-G3U1 Permit No. 007967; and 882-D1U1 Permit No. 006530</p>

^a Permit numbers are based on actual permitted units or activities maintained and renewed by LLNL during 2001.

^b See Acronyms and Abbreviations for list of acronyms.

certifications. The California Department of Fish and Game (CDFG), under the Fish and Game Code Section 1601 et seq. requires streambed alteration agreements (SAAs) for any work that may disturb or impact rivers, streams, or lakes. The Safe Drinking Water Act requires registration with the

EPA and management of injection wells to protect underground sources of drinking water. The Clean Water Act also requires facilities meeting specific storage requirements to have and implement Spill Prevention Control and Countermeasure (SPCC) plans for oil-containing equipment and tanks.

Finally, Alameda County Health Care Services (ACHCS) and San Joaquin County Environmental Health Services issue permits for operating underground storage tanks containing hazardous materials or hazardous waste as required under the California Health and Safety Code. Water-related permits are summarized in [Table 2-5](#) and discussed in detail in Chapters 6, 7, and 9.

Groundwater and Surface Water

In 2001, LLNL discharged storm water associated with industrial activities, low-threat equipment wastewater, process wastewater, sanitary sewage, treated groundwater, and domestic drinking water to surface waters, percolation pits, surface impoundments, septic systems, and sewage ponds under six NPDES permits, four WDRs, and agreements developed under CERCLA ([Table 2-5](#)). Details about surface water discharges are found in Chapter 7 of this report and in quarterly and annual compliance monitoring reports. Details about groundwater monitoring and discharges from CERCLA remediation actions are found in Chapters 8 and 9 of this report and in quarterly and annual compliance monitoring and groundwater program reports.

In July 2000, LLNL submitted a Report of Waste Discharge to the CVRWQCB to amend WDR 96-248 to include low-threat discharge going to ground. Previously, these discharges were permitted under WDR 94-131, which was rescinded by the CVRWQCB in August 2000. The low threat discharges include several discharges previously believed to be discharging to surface waters. The CVRWQCB is currently in the process of amending WDR 96-248 to include these discharges. In addition, to simplify the various administrative mechanisms that currently cover wastewater discharges occurring at Site 300, LLNL requested that discharges covered by waivers of WDRs be consolidated into WDR 96-248.

During 2001, LLNL continued construction of two projects that were covered by the California General Construction Activity permit and terminated coverage for two completed projects (see [Table 2-5](#)). Continuing operations included construction of the Soil Reuse Project and the National Ignition Facility (NIF) at the Livermore site. Construction of the Decontamination and Waste Treatment Facility (DWTF) at the Livermore site and the Contained Firing Facility at Site 300 was completed. Documentation for construction projects ongoing as of September 2001 was revised to comply with the SWRCB Resolution 2001-046, which addresses sampling and analysis.

LLNL received no Notices of Violation (NOVs) in 2001 from the regional water quality control boards that issued the NPDES permits and WDRs; however, LLNL identified administrative nonconformances with one of the six NPDES permits (see [Table 2-6](#)). These events are documented in the annual compliance certification required by NPDES CAS000002 and were reported to the SFBRWQCB at its request. In addition, LLNL was unable to comply with prohibitions in WDR 96-248 on four occasions. These discharges were reported to the applicable regional boards and are discussed further in Chapters 7 and 9.

The CVRWQCB inspected the Site 300 permitted facilities in October 2001. No violations were found during these inspections (see [Table 2-4](#)).

Sewerable Water

The Livermore site's sanitary sewer discharges are sampled continuously to satisfy various permit requirements. The monitoring results for the LLNL effluent were reported monthly to the LWRP. In 2001, LLNL had one discharge in violation of the LWRP permit covering wastewater discharges to the sanitary sewer (see [Table 2-7](#)).

**Table 2-6. Summary of NPDES permit nonconformance**

Permit No.	Outfall	Nonconformance	Date(s) of non-conformance ^(a)	Description—solution
CAS000002	Arroyo Las Positas (Livermore site)	National Ignition Facility—Failure to document some rain-event construction inspections and to perform some inspections.	10/00–4/01	Revised inspection program and provided additional training.

^a These dates reflect the construction reporting period of June 2000 through May 2001. The actual nonconformance may not have occurred over the entire time; however, specific nonconformance dates cannot be determined.

Table 2-7. Summary of nonconformance with LWRP permit limits for discharges to the sanitary sewer

Permit No	Nonconformance	Date(s) of nonconformance	Description—solution
1250	Lead in the May daily effluent sample exceeded the permit limit. LWRP issued a notice of violation dated July 30, 2001.	5/11/01	An effluent sample collected May 12, 2001, confirmed LLNL's return to compliance.

Self-monitoring continued during 2001, as required in the permit. One sample collected in 2001 had constituents that exceeded permit effluent limits. The daily effluent sample collected on May 11, 2001, contained 1.4 mg/L of lead, exceeding the discharge limit of 0.2 mg/L. The LWRP issued an NOV for this discharge dated July 30, 2001.

On October 2 and 9, 2001, the LWRP collected split samples of site effluent as part of the annual compliance sampling. Sample results confirmed compliance with effluent discharge limits. LLNL and LWRP also inspected and sampled federally regulated processes and their wastestreams on October 15 and 31. No facility deficiencies were noted during any of the inspections ([Table 2-4](#)).

In addition, LLNL conducts self-monitoring of federally regulated processes and reports results to the LWRP semiannually.

LLNL monitors discharges from groundwater treatment facilities to sanitary sewer under Permit 1510G (2001) as they occur. Data are reported annually to the LWRP. In 2001, LLNL complied with all the terms and conditions of Permit 1510G. Chapter 6 discusses the self-monitoring programs and the analytical results for the site effluent, categorical processes, and discharges from groundwater treatment facilities.

Streambed Alteration Agreements and Nationwide Permits

CDFG, SFBWQCB, and ACOE all issue permits for work in streambeds ([Table 2-8](#)). In 2001, CDFG Legal Counsel advised LLNL that, because LLNL is a federal facility, LLNL is exempt from SAA requirements for activities conducted in streambeds at the Livermore site and Site 300. To ensure ongoing protection of streambeds, LLNL and CDFG are developing a memorandum of understanding (MOU) regarding LLNL activities that affect streambeds.

Table 2-8. Summary of streambed alteration agreements, Nationwide Permits, and Waste Discharge Requirements

Project	Location	Agency/type of permit ^(a)	Year submitted
Storm-generated debris removal and vegetation management (five-year agreement)	Arroyo Seco	CDFG/SAA	1999
Arroyo Las Positas Maintenance Project (five-year agreement)	Arroyo Las Positas	CDFG/SAA SFBWQCB/WDR ACOE/NWP 18	1998 1999 2000

^a See Acronyms and Abbreviations for list of acronyms.

During 2001, LLNL continued operations allowed under a five-year SAA and WDR issued for the Arroyo Las Positas Maintenance Project. Although LLNL's coverage under Nationwide Permit (NWP) 18 was completed in 2000, LLNL continued to comply with reporting required by NWP 18 through 2001. Operations also continued under an SAA issued for vegetation management in Arroyo Seco. No projects at Site 300 required permits from ACOE during 2001.

Tank Management

LLNL manages its underground and aboveground storage tanks through the use of underground tank permits, monitoring programs, operational plans, closure plans and reports, leak reports and follow-up activities, and inspections. At LLNL, underground storage tanks contain diesel fuel, gasoline, waste oil, and process wastewater; aboveground storage tanks contain diesel fuel, insulating oil, and process wastewater. Some wastewater systems are a combination of underground storage tanks and aboveground storage tanks. [Table 2-9](#) shows the status of tanks at the Livermore site and Site 300 as of December 31, 2001. All regulated underground storage tanks at the Livermore site were inspected by the regulating agency in 2001, and no violations were found (see [Table 2-4](#)).

Resource Conservation and Recovery Act and Related State Laws

The Resource Conservation and Recovery Act (RCRA) and its corresponding regulations provide the framework at the federal level for regulating the generation and management of solid wastes, including wastes designated as hazardous. Similarly, the California Hazardous Waste Control Act (HWCA) and the California Code of Regulations (CCR) Title 22, set requirements for managing hazardous wastes in California. RCRA and HWCA also regulate hazardous waste treatment, storage, and disposal facilities, including permit requirements. Because RCRA program authorization was delegated to the State of California in 1992, LLNL works with DTSC on compliance issues and in obtaining hazardous waste permits.

Hazardous Waste Permits

Livermore Site

The hazardous waste management facilities at the Livermore site consist of permitted units (located in Area 612 and Buildings 693 and 695 of the DWTF) and units that operate under interim status (Area 514 Facility and the Building 233 Container Storage Facility). Permitted and interim status waste management units include container storage, tank storage, and various treatment processes (e.g.,

**Table 2-9. Summary of in-service tanks, December 31, 2001**

Tank type	Livermore site			Site 300		
	Permitted	Permits not required	Total	Permitted	Permits not required	Total
Underground storage tanks						
Diesel fuel	7	0	7	4	0	4
Gasoline	2	0	2	1	0	1
Waste oil	1	0	1	0	0	0
Process wastewater	1	40	41	0	12	12
Subtotal	11	40	51	5	12	17
Aboveground storage tanks						
Diesel fuel	0	27	27	0	6	6
Insulating oil	0	1	1	0	4	4
Process wastewater	10 ^(a)	64	74	0	12	12
Miscellaneous non-waste tanks	0	16	16	0	0	0
Subtotal	10	108	118	0	22	22
Total	21	148	169	5	34	39

^a These 10 tanks are located at the LLNL Treatment and Storage Facility.

wastewater filtration, blending, and size reduction). A final closure plan for the Building 419 Interim Status Facility has been submitted to DTSC for approval.

In accordance with the document *Transition Plan: Transfer of Existing Waste Treatment Units to the Decontamination and Waste Treatment Facility* (EPD 1997), operations in the Area 514 Facility will eventually be replaced by those in the new DWTF, and Area 514 will be closed. The Building 233 Container Storage Facility also will be closed. Final closure plans for the Area 514 Facility and the Building 233 Container Storage Facility were submitted for approval to the DTSC in May 2000.

In May 1999, DTSC signed the hazardous waste permit and issued a Notice of Final Permit Decision for DWTF. In July 1999, Tri-Valley CAREs et al. filed a petition for review to appeal the permit decision. The appeal was denied by the DTSC in November 1999, and the permit immediately became effective.

Tri-Valley CAREs et al. filed a California Environmental Quality Act (CEQA) lawsuit in December 1999 that challenges many of the environmental impact evaluations made in the DTSC initial study, which formed the basis of the CEQA Negative Declaration determination on DTSC. A Settlement Agreement was reached on June 26, 2001, between Tri-Valley CAREs et al. and the Regents of the University of California and DOE. As part of the Settlement Agreement, DTSC, the Regents,

and DOE agreed to comply with all of the items listed under Section 6 (Actions by Respondents) of the Settlement Agreement. The Regents are currently in compliance with their responsibilities described in Section 6. The Regents have delivered all information requested by DTSC to support an evaluation to determine the need for additional permit conditions or modifications. DTSC submitted a status report to Tri-Valley CAREs et al. in December 2001. It provided another status report to them on March 25, 2002.

On June 20–22 2001, DTSC conducted a compliance evaluation inspection of the hazardous waste storage and treatment facilities at the Livermore site. On November 6, 2001, LLNL received notification of an SOV resulting from this inspection. The SOV included two minor violations and one violation categorized as “other violation.” As stated in the SOV, DTSC concurred that all violations were resolved by LLNL (see [Table 2-10](#)).

Site 300

In addition to the four permits active in 2001, a post closure permit application for the Building 829 Open Burn Facility was submitted to DTSC for approval in September 2000. In the last quarter of 2001, LLNL worked on a response to a DTSC notice of deficiency (NOD) letter dated August 29, 2001, and submitted the response document to DTSC in January 2002.

On May 15–18, 2001, DTSC conducted the 2001 compliance evaluation inspection of Site 300 hazardous waste generator areas, Building 883 Waste Accumulation Area (north), Building 883 Container Storage Area, Explosives Waste Storage Facility (EWSF), and the Explosives Waste Treatment Facility (EWTF). As a result of the inspection, DTSC issued an SOV on May 18, 2001, with one violation under the category of “Minor Violations Corrected During the Inspection.”

The minor violation was for five open dry-waste containers. The containers were closed immediately during the inspection.

On August 15, 2001, Site 300 received an amended 2001 inspection report with two additional violations. Violation number one was issued for failure to characterize a solvent waste stream. Violation number two was issued for failure to maintain waste characterization documentation on site for the same solvent waste and an organic acid waste stream, and failure to provide this waste characterization documentation upon request. In response to the violations, LLNL characterized the solvent waste and submitted this information to DTSC on September 14, 2001. The LLNL violation response letter also agreed to maintain the waste characterization documentation on site until closure of the facility and to provide the documentation upon request. This submittal completed all corrective actions required for Site 300 to return to compliance.

Hazardous Waste Reports

LLNL completed two annual hazardous waste reports, one for the Livermore site and the other for Site 300, that address the 2001 transportation, storage, disposal, and recycling of hazardous wastes. The annual reports, required under 22 CCR 66262.41, were completed and submitted to meet DTSC’s April 1, 2001, deadline. These same reports, *2001 Hazardous Waste Report—Mainsite* and *2001 Hazardous Waste Report—Site 300* (Raber and Gilbert 2001a, b), were submitted to the EPA under Sections 3002 and 3004 of RCRA, which requires a biennial reporting of hazardous wastes. DTSC is authorized to receive the reports for EPA.



Hazardous Waste Transport Registration

Transportation of hazardous waste over public roads (e.g., from one LLNL site to another) requires DTSC registration (22 CCR 66263.10). DTSC renewed LLNL's registration in November 2001. Conditions for registration include a biennial inspection of terminals report (BIT Report) by California Highway Patrol (CHP), and special training and annual physical examinations for drivers. The biennial inspection of terminals resulted in a "satisfactory" rating, which is the highest rating possible.

Waste Accumulation Areas

In January 2001, there were 22 waste accumulation areas (WAAs) at the Livermore site. Four temporary WAAs were put into service, and four temporary WAAs were taken out of service. Program representatives conducted inspections at least weekly at all WAAs to ensure that they were operated in compliance with regulatory requirements. Approximately 1184 prescribed WAA inspections were conducted at the Livermore site.

One WAA was in operation at Site 300 during 2001. Program representatives conducted 52 prescribed inspections of the WAA at Site 300.

California Medical Waste Management Act

All LLNL medical waste management operations comply with the California Medical Waste Management Act, Health and Safety Code Sections 117600–118360, Chapters 1–11. The Medical Waste Management Act establishes a comprehensive program for regulating the management, transport, and treatment of medical wastes that contain substances that may potentially infect humans. The program is administered by the State Department

of Health Services (DHS) and is enforced by the Alameda County Department of Environmental Health (ACDEH).

LLNL is registered with the ACDEH as a generator of medical waste and has a treatment permit. The September 2001 ACDEH inspection of buildings at Health Services, the Biology and Biotechnology Research Program, and the Medical Photonics Lab did not result in any compliance issues or violations (see [Table 2-4](#)).

Federal Facility Compliance Act

LLNL is continuing to work with DOE to maintain compliance with the Federal Facilities Compliance Act Site Treatment Plan (STP) for Lawrence Livermore National Laboratory that was signed in February 1997. All milestones for 2001 were completed on time. Reports and certification letters were submitted to DOE as required. An agreement was reached with DTSC to extend all FY02 and FY03 milestones to allow LLNL to concentrate resources on characterizing and disposing of transuranic (TRU) waste. LLNL continued to pursue the use of commercial treatment and disposal facilities that are permitted to accept mixed waste. These facilities provide LLNL greater flexibility in pursuing the goals and milestones set forth in the STP.

Toxic Substances Control Act

The Federal Toxic Substances Control Act (TSCA) and implementing regulations found in 49 CCR 700–789, govern the uses of newly developed chemical substances and TSCA-governed waste by establishing requirements for recordkeeping, reporting, disposal standards, employee protection, compliance and enforcement, and cleanup standards.

In 2001, LLNL generated PCB-containing waste from CERCLA cleanup projects, PCB oil drained from electrical equipment, electrical equipment contaminated with PCBs, liquid PCBs used to calibrate analytical equipment, and TSCA-regulated asbestos from building demolition or renovation projects.

All TSCA-regulated waste was disposed of in accordance with TSCA, state, and local disposal requirements except for radioactively contaminated PCB waste. Radioactive PCB waste, typically known as TRU mixed waste or mixed waste, is currently stored at one of LLNL's hazardous waste storage facilities until the Waste Isolation Pilot Project, or other approved facility, accepts this waste for final disposal.

National Environmental Policy Act

The National Environmental Policy Act (NEPA; 42 U.S. Code [USC] 4321 et seq.) established federal policy for protecting environmental quality. The major method for achieving established NEPA goals is the requirement of preparing an environmental impact statement (EIS) for any major federal or federally funded project that may have significant impact on the quality of the human environment. If the need for an EIS is not clear, or if the project does not meet DOE's criteria for requiring an EIS, an environmental assessment (EA) is prepared. A Finding Of No Significant Impact (FONSI) is issued when an EIS is determined to be unnecessary.

Certain groups of actions that do not have a significant effect on the environment either individually or cumulatively can be categorically excluded from a more in-depth NEPA review (i.e., preparation of either an EA or EIS). DOE NEPA implementing procedures (61 FR 36222 and 57 FR 15122) identify those categorical exclusions and the eligibility criteria for their application. If a proposed project

does not clearly fit one of the exclusion categories, DOE determines which type of assessment document may be needed.

In 2001, no DOE EAs were prepared for LLNL projects. Thirty-five categorical exclusion applications were approved by DOE, and there were no proposed actions at LLNL that required separate DOE floodplain or wetlands assessments under DOE regulations in 10 CFR 1022. In March 1999, DOE issued a *Supplement Analysis* (U.S. DOE 1999) that concluded that the 1992 *Final Environmental Impact Statement and Environmental Impact Report for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore* (1992 EIS/EIR) (U.S. DOE and UC 1992a,b) did not need to be supplemented and remained adequate.

California Environmental Quality Act

In November 1992, the University of California (UC) and LLNL made a commitment to implement 67 mitigation measures identified by the 1992 EIS/EIR and to provide annual reports on their implementation. An addendum to the EIR was prepared in 1997. The measures are being implemented in accordance with the approved 1992 Mitigation Monitoring and Reporting Program associated with that joint DOE/UC EIS/EIR. The 1997 and 1998 fiscal year Mitigation Monitoring reports were published in 2001. The 1999–2001 fiscal year Mitigation Monitoring reports will be published in 2002.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) applies to historically important places and things affected by the federal government. LLNL contains resources subject to NHPA consideration. These



range from prehistoric archeological sites to remnants of the Laboratory's own history of scientific and technological endeavor.

The responsibility to comply with the provisions of NHPA rests solely with DOE as a federal agency. The Laboratory, and the University of California as its contractor operator, supports DOE NHPA responsibilities. LLNL does so in a limited manner as directed by DOE.

NHPA contains two primary sections that apply to LLNL: Sections 106 and 110.

Section 106 requires federal agencies to take into account the effects their projects may have on historic properties. The agencies must allow and consider comments of the federal Advisory Council on Historic Preservation. The Section 106 rules outline a five-step review process that is conducted on a project-by-project basis.

Section 110 sets forth broad affirmative responsibilities to balance agency missions with cultural values. Its purpose is to ensure full integration of historic preservation into federal agency programs.

LLNL is working on two approaches to streamline historic preservation efforts and focus on important historic properties. One approach is to construct an agreement among DOE, the federal Advisory Council on Historic Preservation, and the State Historic Preservation Office. This device is called a programmatic agreement (PA). Since 1997, LLNL has drafted several versions of a historic preservation PA. LLNL continued to work on this effort in 2001, but a final agreement has not been signed.

The second approach is to complete an inventory of places that meet a statutory threshold of historic importance. During 2001, LLNL management funded development of historic background infor-

mation, a necessary precursor for the inventory, and also funded an analysis to make recommendations for historic significance determinations at the Livermore site and Site 300.

During 2001, LLNL completed historic evaluations of five buildings (Buildings 222, 412, 415, 490, and 865) and initiated evaluations for six additional buildings. Only Building 865 is eligible for listing in the National Register of Historic Places. Also during 2001, LLNL renovated its archeological collections to meet the federal standard for long-term storage of such materials. These efforts involved development of a catalog, cleaning and storage of artifacts in approved containers, and labeling of artifacts and records.

Endangered Species Acts and Sensitive Natural Resources

LLNL must meet the requirements of the U.S. Endangered Species Act, the California Endangered Species Act, and the California Native Plant Protection Act as they pertain to Endangered or Threatened species and their habitats, other species of special concern, and critical habitats that may exist or are known to exist at the LLNL sites. For example, in implementing the 1992 Mitigation Monitoring and Reporting Program in 2001, biological assessment surveys were performed for special-status species at 45 LLNL Site 300 project construction (ground-disturbing) areas. Presence data for the San Joaquin kit fox (*Vulpes macrotis mutica*), American badger (*Taxidea taxus*), and western burrowing owl (*Speotyto cunicularia hypugaea*) were collected at each project location, and other applicable mitigation measures were implemented where appropriate.

During 2001, at Site 300, no active San Joaquin kit fox dens were discovered, but one potential den was found. Three occupied American badger dens were discovered, and two unoccupied dens were

identified. Eight active burrowing owl dens were discovered and monitored throughout the breeding and wintering season. Site 300 populations of the federally-listed threatened California red-legged frog (*Rana aurora draytonii*) and a federal species of concern, the California tiger salamander (*Ambystoma californiense*), were monitored at wetland locations statewide.

Livermore site populations of the California red-legged frog (*Rana aurora draytonii*) were monitored in accordance with the 1997 and 1998 amended U.S. Fish and Wildlife Service Biological Opinion for the Arroyo Las Positas Maintenance Project. One-hundred- to three-hundred-foot checkerboard sections in the Arroyo were managed for excess in-stream vegetation and 47 California red-legged frogs were protected from harm in project locations during the maintenance process. The United States Fish and Wildlife Service has designated critical habitat for the California red-legged frog since 2001. The North Buffer Zone and eastern edge of the Livermore site is now considered critical habitat for the California red-legged frog.

In addition, in 2001, a new monitoring strategy for California red-legged frogs was initiated at the Livermore site. Instead of basing population solely on observations of the frog life stage, egg masses were counted and located by global positioning system (GPS). Egg masses are conspicuous, making them a readily available indicator of population. The oviposition site (location and attachment point) was quantified to yield greater insight into what micro-habitat characteristics might be important to California red-legged frog breeding ecology in the Arroyo Las Positas. The results of the survey suggest that the Livermore site Arroyo Las Positas population is small but viable with 37 egg masses counted (roughly the same number of egg masses as the previous year). Because predation is high, the

actual number of frogs produced per egg mass is unknown. Further annual surveys will document the true viability of this population.

Bullfrog control continued in 2001 with the direct removal of both breeding adults and eggs from the Drainage Retention Basin (DRB). The bullfrog control program appears to be reducing the overall numbers after the original introduction and subsequent population explosion. California red-legged frog breeding in the DRB was documented for the first time after draining the basin to remove bullfrog larvae and catfish (both are non-native predators) in January 2001.

Also at the Livermore site, one pair of white-tailed kites (*Elanus leucurus*) successfully fledged three young and a pair of red-shouldered hawks (*Buteo lineatus*) fledged two young.

Four rare plant populations are known to occur at Site 300. These are the large-flowered fiddleneck (*Amsinckia grandiflora*), a federally-listed endangered plant species; the big tarplant (*Blepharizonia plumosa*, also known as *Blepharizonia plumosa* ssp. *plumosa*), listed on the California Native Plant Society Rare Plant 1A List (Tibor 2001); the diamond-petaled poppy (*Eschscholzia rhombipetalata*), a plant thought to be extinct until rediscovered in 1993, now listed on the revised California Native Plant Society 1A list (Tibor 2001); and the gypsum-loving larkspur (*Delphinium gypsophilum* ssp. *gypsophilum*), listed on the California Native Plant Society Rare Plant 4 list (Tibor 2001). Restoration and/or monitoring activities were conducted for three of these species in 2001 (the large-flowered fiddleneck, the big tarplant, and the diamond-petaled poppy), and the results of this work are described in more detail in an annual progress report (Carlsen et al. 2002). Future periodic monitoring will be conducted for the gypsum-loving larkspur.



Two of the three known natural populations of the large-flowered fiddleneck occur at Site 300. A portion of Site 300 has been designated as critical habitat area for the plant. In April 2000, this area was designated the *Amsinckia grandiflora* Reserve through a declaration by Secretary of the U.S. Department of Energy. A memorandum of agreement was signed between the DOE and the U.S. Fish and Wildlife Service concerning activities within the reserve. LLNL has also established an experimental population within the reserve. LLNL is working with the U.S. Fish and Wildlife Service on continued monitoring of native and experimental *Amsinckia* populations, and to further develop habitat restoration and maintenance techniques. The annual progress report prepared by LLNL was submitted to the U.S. Fish and Wildlife Service in April 2002 (Carlsen et al. 2002).

The smaller of the two on-site native populations of fiddleneck appears to have been extirpated in 1997 when the bank containing the population washed away. Although no plants have been observed at this site since 1998, other fiddleneck populations have suffered severe declines in recent years, and the area will continue to be monitored. The number of fiddleneck plants in the larger native population has been at historic lows for the past three years (14 plants were observed in 2001, with 40 plants observed in 2000 and 6 in 1999). The number of fiddleneck plants observed in the original experimental population area (59 plants) is similar to that observed during the past two years (45 plants in 2000 and 42 plants in 1999). The experimental population was expanded in 2000 to investigate more fully the use of fire as a management tool. The existing seed bank from the 148 *Amsinckia grandiflora* plants that flowered in the twenty native bunch-grass-restored plots in 2000 was enhanced between December 2000 and January 2001 with the addition of approximately

250 seeds into the plots. This resulted in a total of 257 *Amsinckia grandiflora* flowering plants in this area in 2001.

The low numbers of *Amsinckia grandiflora* plants observed over the past several years at Site 300 have also been observed in other existing natural and experimental populations of the fiddleneck throughout its existing range. A dramatic increase in seed predation by small rodents was observed in the Site 300 experimental population in 1998 and 1999. However, seed predation was much reduced in 2000. Unfortunately, this did not translate into increased numbers of *Amsinckia grandiflora* in either the native or experimental populations. Seed predation was again on the rise in 2001, but remained below that observed in 1998 and 1999.

Significant expansion of bush lupine (*Lupinus albus*) and gum-plant (*Grindelia camporum*), both native, shrubby forbs, have occurred in the area of the native *Amsinckia grandiflora* population. Bush lupine, a nitrogen fixer, can significantly change vegetation structure, and the overstory canopy of this site is becoming quite closed with large amounts of introduced grasses. Manual clipping and removal of some of the overstory to encourage *Amsinckia grandiflora* germination and establishment is being discussed with the U.S. Fish and Wildlife Service. Bush lupine expansion is known to be cyclical, and some evidence of natural dieback is beginning to appear.

Monitoring of the big tarplant (*Blepharizonia plumosa*), and the diamond-petaled poppy (*Eschscholzia rhombipetala*) continued in 2001. The big tarplant remained widespread throughout Site 300, with the number and size of the populations similar to that observed in 2000. Detailed monitoring of populations located in areas undergoing controlled burning is also being conducted to determine the impacts of fire on the population dynamics of this species. A total of 189 diamond-

petaled poppy plants were observed in 2001 (down somewhat from the 273 plants observed in 2000, but still significantly higher than the 9 plants observed in 1999). The majority of these plants produced seed-bearing pods.

Antiquities Act (of 1906): Paleontological Resources

Provisions of the Antiquities Act provide for recovery of paleontological remains. With the discovery of mammoth remains in conjunction with National Ignition Facility construction in 1997, LLNL has remained vigilant for other fossil finds. No remains subject to the provisions of the Antiquities Act were identified in 2001.

Environmental Occurrences

Notification of environmental occurrences is required under a number of environmental laws and regulations as well as DOE Order 232.1, *Occurrence Reporting and Processing of Operations Information*. DOE Order 232.1 provides guidelines to contractor facilities regarding categorization and reporting of environmental occurrences to DOE and divides occurrences into two categories: unusual occurrences and off-normal occurrences. Operational emergencies are also reported under DOE Order 232.1; however, DOE Order 151.1, *Categorization and Classification of Operational Emergencies*, defines the criteria for categorization and classification of operational emergency events.

The Environmental Protection Department's (EPD) response to environmental occurrences is part of the larger LLNL on-site emergency response organization that also includes representatives from Hazards Control (including the LLNL Fire Department), Health Services, Plant Engineering, Public Affairs, Safeguards and Security, and Site 300. In 2001, seven environmental incidents, summarized in [Table 2-10](#), were reportable under DOE Order 232.1 and were categorized as off-normal occurrences according to DOE Order 232.1.

Agencies notified of these incidents included DOE, Alameda County Department of Health Services, and San Francisco Bay Regional Water Quality Control Board.

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**Table 2-10. Environmental occurrences reported under the Occurrence Reporting (OR) System, 2001**

Date ^(a)	Occurrence category	Description ^(b)
January 12	Off-Normal	LLNL received an NOV from the LWRP on January 12, 2001, for exceeding Federal pretreatment categorical effluent limits for the discharge from the Building 321C water jet machine. Analytical results of samples collected on November 2, 2000, from the discharge of the Building 321C water jet machine indicated a chromium concentration of 8.2 mg/L and a nickel concentration of 3.6 mg/L. The chromium and nickel concentrations exceed the applicable Federal pretreatment categorical effluent limits of 1.71 mg/L for chromium and 2.38 mg/L for nickel. The LLNL organization responsible for the water jet operation took prompt action to correct the situation and prevent future occurrences. On February 1, 2001, the LWRP resampled the process and deemed the operation in compliance. Receiving an NOV meets the requirements of an Off-Normal occurrence. OR 2001-0002.
February 22	Off-Normal	On February 22 and 23, LLNL reported the release of methyl tertiary-butyl ether (MTBE) at Building 611. In November 2000, an inspector from the Alameda County Health Care Services noted a deficiency during the inspection of the Building 611 gasoline and diesel underground storage tanks. The deficiency noted the absence of gaskets and bolts from the underground tank system man way covers. In addition, the regulator requested that a sample be obtained from water observed in the tank system containment area directly beneath the man way covers. Analytical results from subsequent samples indicated the possible presence of MTBE in the water at 19.0 mg/L. The possible release of MTBE was reported to the Alameda County Department of Health Services and the San Francisco Bay Regional Water Quality Control Board on February 22 and February 23, 2001. Subsequently, it was determined that the MTBE contaminated water was contained within the containment structure surrounding the underground piping and man way covers. While no contaminated water was detected outside the secondary containment, the OR was initiated to address the non-routine notification of any outside agency. This was reported under the Off-Normal category. OR 2001-0007.
May 16	Off-Normal	Three potentially contaminated countertops were disposed of before being properly cleared for release. Three potentially contaminated stainless steel countertops from Building 227 were stored in the Building 227 Staging Area. The countertops were painted red to signify that they were potentially contaminated with a hazardous material and not yet cleared for disposal. According to the procedure, potentially contaminated items are painted red. Once the item has been evaluated and determined to be clear for disposal, it is painted green. During activities on the job site, several cleared countertops that were painted green were inadvertently stacked on top of the three red countertops. It is believed that the entire stack of countertops, including the three potentially contaminated countertops, was sent to the landfill. Upon review of the survey data and process knowledge, it was concluded that the items were suitable for free release to the public. This was reported under the Off-Normal category. OR 2001-0017.
May 18	Off-Normal	On May 17, 2001, LLNL received an SOV from the DTSC. While conducting an inspection of the Explosives Waste Storage Facility (EWSF) at Site 300, the DTSC inspector noticed that the lock rings on five 55-gallon drums containing solid hazardous waste were not tight. All five drums had the lids in place, the lock rings with bolts installed, and the waste inside the drums was contained in plastic bags; however, the bolts were determined to be not sufficiently tight and therefore the containers were not considered adequately closed. Although the discrepancy was immediately corrected during the inspection, the DTSC issued a formal violation for this discrepancy. Receiving an SOV meets the requirements of an Off-Normal occurrence. OR 2001-0018.

Table 2-10. Environmental occurrences reported under the Occurrence Reporting (OR) System, 2001

Date^(a)	Occurrence category	Description^(b)
August 1	Off-Normal	LLNL received an NOV from the LWRP for exceeding the effluent discharge permit limit for lead. Analysis of the daily compliance sample representing May 11 identified lead present at 1.4 mg/L. The LLNL permit limit for lead is 0.20 mg/L. Receiving an NOV meets the requirement of an Off-Normal occurrence. OR 2001-0029.
August 15	Off-Normal	<p>LLNL received an addendum to an earlier SOV received from the DTSC for findings from the May 17 and May 18 inspection of Site 300. On May 17, the DTSC issued an SOV for failing to keep containers of hazardous waste adequately closed (OR 2001-0018). On August 15, LLNL received an addendum to the SOV, identifying two additional findings from the May 17 and May 18 inspection. The new findings included:</p> <ul style="list-style-type: none"> • Failing to conduct a detailed waste analysis of the spent parts washer waste for waste listed on manifest #99555391 • Failing to maintain and provide records, waste analysis, and waste determination for waste streams on manifest 99555390, line 11(c) and 99555391, line 11(a). <p>Receiving an SOV meets the requirements of an Off-Normal occurrence. OR 2001-0033.</p>
September 12	Off-Normal	<p>LLNL received an SOV from the DTSC for findings observed during the DTSC inspection of the Livermore site on June 20-22. During the DTSC inspection of the Livermore site, the DTSC observed and documented three findings:</p> <ul style="list-style-type: none"> • Storage of hazardous waste for greater than 90 days at a location that was not authorized for storage of hazardous waste by permit, interim status, or variance. (Corrected 4/3/01) • Failure to mark each lab-packed container with the earliest date of acceptance of any original hazardous waste container to be placed into the lab-pack. (Corrected 7/5/01) • Inaccurate storage date in the operating record. (Corrected 7/20/01) <p>Receiving an SOV meets the requirements of an Off-Normal Occurrence. OR 2001-0037</p>

^a The date indicated is the date when the occurrence was categorized, not the date of its discovery.

^b See Acronyms and Abbreviations for list of acronyms